

1 WHAT IS CLAIMED IS:

2 1. A method of treating food items having individual muscle
3 protein fibers at least partially covered by a collagen protein
4 layer, said method comprising the step of pressing said food items
5 using a pliable material which conforms to and at least partially
6 surrounds said food items during said step of pressing, wherein
7 pressure is applied to said food items in said step of pressing
8 using said pliable material in a manner effective for rupturing
9 said collagen protein layer sufficiently to form an opening
10 therethrough.

11
12 2. The method of claim 1 wherein, in said step of pressing, said
13 food items are pressed between a first layer of said pliable
14 material having a first surface and a second layer of a pliable
15 material having a second surface.

16
17 3. The method of claim 2 wherein said first and said second
18 surfaces conform to said food items in said step of pressing to at
19 least partially surround said food items.

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1 4. The method of claim 3 wherein said first and said second
2 surfaces completely surround said food items in said step of
3 pressing.

4
5 5. The method of claim 3 wherein said first layer is a covering
6 for a plunger and said second layer covers at least an interior
7 portion of a cavity wherein said plunger is receivable for pressing
8 said food items.

9
10 6. The method of claim 3 wherein said food items are pressed in
11 said step of pressing between a first continuous belt comprising
12 said first layer and a second continuous belt comprising said
13 second layer.

14
15 7. The method of claim 6 wherein said pressure is applied to said
16 food items in said step of pressing by contacting said first
17 continuous belt with at least a first roller which urges said first
18 continuous belt toward said second continuous belt and by
19 contacting said second continuous belt with at least a second
20 roller which urges said second continuous belt toward said first
21 continuous belt.

22

1 8. The method of claim 2 wherein said food items are bone-in
2 product pieces and said pressure applied in said step of pressing
3 is in the range of from about 15 to about 120 psig.

4
5 9. The method of claim 2 wherein said food items are boneless
6 product pieces and said pressure applied in said step of pressing
7 is in the range of from about 2 to about 100 psig.

8
9 10. The method of claim 1 wherein said step of pressing comprises
10 a series of at least two applications of pressure to said food
11 items using said pliable material.

12
13 11. The method of claim 1 further comprising the step, following
14 said step of pressing, of infusing a treatment liquid into said
15 food items through said opening.

16
17 12. The method of claim 11 wherein said step of infusing comprises
18 vacuum tumbling said food items.

19
20 13. The method of claim 11 wherein said step of infusing comprises
21 needle injecting said treatment liquid into said food items.

22

1 14. The method of claim 11 wherein said step of infusing comprises
2 impacting said food items while moving said food items through said
3 treatment liquid.

4
5 15. The method of claim 14 wherein, in said step of infusing, said
6 food items are at least partially suspended in an amount of said
7 treatment liquid of at least one pound of said treatment liquid per
8 pound of said food items.

9
10 16. The method of claim 14 wherein, in said step of infusing, said
11 food items are continuously moved through said treatment liquid by
12 a submerged conveyor.

13
14 17. The method of claim 16 wherein said food items are impacted in
15 said step of infusing by contacting with flexible fingers as said
16 food items are carried through said treatment liquid.

17
18 18. The method of claim 14 wherein, in said step of infusing, said
19 food items are continuously moved through said treatment liquid by
20 rotating spiral flites.

21

1 19. The method of claim 18 wherein said food items are impacted in
2 said step of infusing by contacting with at least one rotating
3 paddle.

4
5 20. The method of claim 19 wherein said paddle rotates in a
6 direction opposite that of said spiral flites.

7
8 21. A food item treated in accordance with the method of claim 1.

9
10 22. A food item treated in accordance with the method of claim 5.

11
12 23. A food item treated in accordance with the method of claim 6.

13
14 24. A food item treated in accordance with the method of claim 11.

15
16 25. A food item treated in accordance with the method of claim 14.

17
18 26. A food item treated in accordance with the method of claim 20.

19
20 27. A method of treating food items, said food items comprising
21 muscle protein and said method comprising the step of pressing said
22 food items between a first layer of a pliable material having a

1 first surface and a second layer of a pliable material having a
2 second surface, wherein said first and said second surfaces conform
3 to and at least partially surround said food items in said step of
4 pressing and wherein an amount of pressure is applied to said food
5 items in said step of pressing in the range of from about 2 to
6 about 120 psig.

7
8 28. The method of claim 27 wherein said food items are bone-in
9 product pieces and said amount of pressure applied in said step of
10 pressing is in the range of from about 15 to about 120 psig.

11
12 29. The method of claim 27 wherein said food items are boneless
13 product pieces and said amount of pressure applied in said step of
14 pressing is in the range of from about 2 about 100 psig.

15
16 30. The method of claim 27 wherein said first layer is a cover for
17 a plunger and said second layer covers at least an interior portion
18 of a cavity wherein said plunger is receivable for pressing said
19 food items.

20
21 31. The method of claim 27 wherein said food items are pressed in
22 said step of pressing between a first continuous belt comprising

1 said first layer and a second continuous belt comprising said
2 second layer.

3
4 32. The method of claim 31 wherein said pressure is applied to
5 said food items in said step of pressing by contacting said first
6 continuous belt with at least a first roller which urges said first
7 continuous belt toward said second continuous belt and by
8 contacting said second continuous belt with at least a second
9 roller which urges said second continuous belt toward said first
10 continuous belt.

11
12 33. The method of claim 27 wherein each of said first and said
13 second layers has a thickness of at least one-half inch.

14
15 34. The method of claim 27 further comprising the step, following
16 said step of pressing, of infusing a treatment liquid into said
17 food items.

18
19 35. The method of claim 34 wherein said step of infusing comprises
20 vacuum tumbling of said food items.

1 36. The method of claim 34 wherein said step of infusing comprises
2 needle injecting said treatment liquid into said food items.
3

4 37. The method of claim 34 wherein said step of infusing comprises
5 impacting said food items while moving said food items through said
6 treatment liquid.
7

8 38. The method of claim 37 wherein, in said step of infusing, said
9 food items are at least partially suspended in an amount of said
10 treatment liquid of at least one pound of said treatment liquid per
11 pound of said food items.
12

13 39. The method of claim 37 wherein said food items are impacted in
14 said step of infusing by contacting with flexible fingers as said
15 food items are moved through said treatment liquid.
16

17 40. The method of claim 37 wherein, in said step of infusing, said
18 food items are continuously moved through said treatment liquid by
19 rotating spiral flites.
20

1 41. The method of claim 40 wherein said food items are impacted in
2 said step of infusing by contacting with at least one rotating
3 paddle.

4
5 42. The method of claim 41 wherein said paddle rotates in a
6 direction opposite that of said spiral flites.

7
8 43. A food item treated in accordance with the method of claim 27.

9
10 44. A food item treated in accordance with the method of claim 28.

11
12 45. A food item treated in accordance with the method of claim 29.

13
14 46. A food item treated in accordance with the method of claim 30.

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16 47. A food item treated in accordance with the method of claim 31.

17
18 48. A food item treated in accordance with the method of claim 34.

19
20 49. A food item treated in accordance with the method of claim 37.

21
22 50. A food item treated in accordance with the method of claim 42.

1 51. An apparatus for pressing food items comprising:

2 a first rotatable continuous belt having a contacting run,
3 said contacting run having a contacting surface and a
4 direction of travel;

5 a second rotatable continuous belt having a pressing run with
6 a pressing surface adjacent to said contacting surface,
7 said second continuous belt also being operable such that
8 said pressing run will move in said direction of travel;
9 and

10 at least a first roller positioned against said pressing run
11 such that said first roller will urge said pressing
12 surface toward said contacting surface in a manner
13 effective for pressing food items as they are carried
14 between said pressing run and said contacting run in said
15 direction of travel,

16 wherein said first continuous belt is formed of a pliable
17 material and said second continuous belt is formed of a
18 pliable material such that said pressing surface and said
19 contacting surface will conform to and at least partially
20 surround said food items as said food items are pressed
21 between said surfaces.

1 52. The apparatus of claim 51 wherein said pressing surface and
2 said contacting surface will completely surround said food items as
3 said food items are pressed between said surfaces.
4

5 53. The apparatus of claim 51 wherein each of said belts has a
6 thickness of at least one-half inch.
7

8 54. The apparatus of claim 51 further comprising at least a second
9 roller positioned against said contacting run such that said second
10 roller will urge said contacting surface toward said pressing
11 surface in a manner effective for further pressing said food items
12 as they are carried between said pressing run and said contacting
13 run in said direction of travel.
14

15 55. The apparatus of claim 54 wherein at least one of said first
16 roller and said second roller is selectively positionable toward or
17 away from the other of said rollers along said direction of travel.
18
19

20 56. The apparatus of claim 54 wherein said rollers are
21 positionable in a manner effective for applying a pressure in the
22 range of from about 2 psig to about 120 psig to said food items as

1 said food items are carried between said pressing run and said
2 carrying run in said direction of travel.
3

4 57. An apparatus for pressing food items comprising:

5 a holding structure having a holding structure covering with

6 a holding cover surface and

7 a pressing structure having a pressing structure covering with

8 a pressing cover surface, said pressing structure being

9 reciprocatingly movable toward said holding structure for

10 pressing food items between said pressing cover surface

11 and said holding cover surface,

12 wherein said holding structure covering is formed of a pliable

13 material and said pressing structure covering is formed

14 of a pliable material such that said holding cover

15 surface and said pressing cover surface will conform to

16 and at least partially surround said food items as said

17 food items are pressed between said surfaces.
18

19 58. The apparatus of claim 57 wherein, when said food items are
20 pressed between said holding cover surface and said pressing cover
21 surface, said surfaces will completely surround said food items.
22

1 59. The apparatus of claim 57 wherein said holding structure
2 includes a holding cavity and said pressing structure is a plunger
3 receivable in said holding cavity.
4

5 60. The apparatus of claim 59 wherein said holding structure is
6 carried by a rotatable structure.
7

8 61. The apparatus of claim 60 wherein said rotatable structure
9 carries at least one additional holding structure in which said
10 plunger is reciprocatingly receivable.
11

12 62. An apparatus for infusing food items with a liquid comprising:
13 a container for containing an amount of said liquid at a
14 liquid level;

15 a conveyor extending through at least a portion of said
16 container beneath said liquid level such that said
17 conveyor will continuously move said food items through
18 said liquid; and

19 a plurality of contact members positioned above and extending
20 toward said conveyor such that said contact members will
21 contact and massage said food items as they move through
22 said liquid.

1 63. The apparatus of claim 62 wherein said contact members are
2 drag fingers.

3
4 64. The apparatus of claim 62 further comprising means for
5 creating swirling currents in said container.

6
7 65. The apparatus of claim 64 wherein said means is selected from
8 paddles, spray nozzles, or a combination thereof.

9
10 66. An apparatus for infusing food items with a liquid comprising:
11 a drum rotatable with said liquid therein at a liquid level,
12 said drum having spiral flites therein and a longitudinal
13 opening extending through said flites such that said
14 liquid level will extend partially into said longitudinal
15 opening; and
16 at least one paddle rotatably mounted in said longitudinal
17 opening of said drum such that said paddle will contact
18 said liquid.

19
20 67. The apparatus of claim 66 wherein said drum is rotatable in a
21 first direction and said paddle is rotatable in a second direction
22 counter to said first direction.

1 68. The apparatus of claim 66 wherein said paddle has a swept back
2 configuration away from said second direction.
3

4 69. The apparatus of claim 66 further comprising a plurality of
5 lift bars extending longitudinally along an interior wall of said
6 drum.
7

8 70. The apparatus of claim 66 wherein said drum has an end with an
9 opening therein sized and positioned to maintain said liquid level
10 in said drum by allowing an excess amount of said liquid to flow
11 out of said drum.
12

13 71. The apparatus of claim 70 further comprising a container to
14 receive said excess amount of said liquid from said opening.
15

16 72. The apparatus of claim 71 further comprising recirculating
17 means for recirculating said liquid from said container to said
18 drum.
19

20 73. An apparatus for treating food items comprising:
21 a continuous press having two layers of pliable material
22 between which said food items are receivable for pressing

1 to produce a pressed product, said two layers having
2 surfaces which will conform to and at least partially
3 surround said food items when pressing and
4 a liquid infusion device having
5 a container for containing a liquid,
6 a food conductor positioned to continuously conduct said
7 pressed product through said liquid, and
8 at least one contact member positioned in a manner
9 effective to contact and massage said pressed
10 product as it is continuously conducted through
11 said liquid.
12

13 74. The apparatus of claim 73 wherein said continuous press
14 further comprises means for urging at least one of said surfaces
15 toward the other of said surfaces.
16

17 75. The apparatus of claim 74 wherein said means for urging
18 comprises a plunger.
19

20 76. The apparatus of claim 74 wherein said means for urging is a
21 roller.
22

1 77. The apparatus of claim 73 wherein said food conductor is a
2 conveyor belt.

3
4 78. The apparatus of claim 73 wherein said food conductor
5 comprises rotatable spiral flites.

6
7 79. The apparatus of claim 78 wherein said contact member
8 comprises a paddle rotatably mounted in said spiral flites.

9
10 80. The apparatus of claim 73 wherein said food items have a
11 collagen protein layer and said continuous press is effective for
12 applying sufficient pressure to said food items when positioned
13 between said two layers of pliable material to rupture said
14 collagen protein layer sufficiently to form an opening
15 therethrough.

16
17 81. The apparatus of claim 73 wherein said continuous press is
18 effective for applying a pressure to said food items when
19 positioned between said two layers of pliable material in the range
20 of from about 2 to about 120 psig.

21

1 82. A method of treating food items having individual muscle
2 protein fibers at least partially covered by a collagen protein
3 layer, said method comprising the steps of:

4 (a) applying a force to said food items effective for
5 rupturing said collagen protein layer sufficiently to
6 form an opening therethrough and

7 (b) infusing a treatment liquid into said food items through
8 said opening.

9
10 83. The method of claim 82 wherein said treatment liquid is
11 infused into said food items in step (b) by impacting said food
12 items while moving said food items through said treatment liquid.

13
14 84. The method of claim 83 wherein, in said step of infusing, said
15 food items are at least partially suspended in an amount of said
16 treatment liquid of at least one pound of said treatment liquid per
17 pound of said food items.

18
19 85. The method of claim 83 wherein, in said step of infusing, said
20 food items are continuously moved through said treatment liquid by
21 a submerged conveyor and are impacted by contacting with flexible
22 fingers.

1 86. The method of claim 83 wherein, in said step of infusing, said
2 food items are continuously moved through said treatment liquid by
3 rotating spiral flites.

4

5 87. The method of claim 86 wherein said food items are impacted in
6 said step of infusing by contacting with at least one rotating
7 paddle.

8

9 88. The method of claim 87 wherein said paddle rotates in a
10 direction opposite that of said spiral flites.

11

12 89. A food item treated in accordance with the method of claim 82.

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14 90. A food item treated in accordance with the method of claim 83.

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16 91. A food item treated in accordance with the method of claim 88.